SOME SPECIES OF TYPHLODROMUS FROM DWARF MISTLETOES IN NORTH AMERICA

(Acarina: Phytoseiidae)

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Preliminary investigations into the possibilities of biological control of dwarf mistletoes *(Arceuthobium* spp.) during the past two years by Dr. C. B. Huffaker and Mr. J. Hamai of the University of California, Department of Biological Control, have led to the recovery of several species of Phytoseiidae from widely separated localities in North America.

To date, five species of the genus *Typhlodromus* have been recovered from dwarf mistletoes. Of these, two species are described for the first time and are placed in the subgenera of *Typhlodromus* as defined by Chant (1957a). A third species consisting of a single specimen from Red Bay, Ontario, Canada is considered by Chant as being very near *Typhlodromus (Amblyseius) rosellus* Chant. The remaining two species are *Typhlodromus (Typhlodromus) bakeri* (Garman) and *Typhlodromus (Typhlodromus) validus* Chant.

Typhlodromus (Typhlodromus) arceuthobius Kennett, new species

(Figs. 1, 2)

Female.—Dorsal shield narrowly ovate in outline, widest at posterior one-third, reticulate, with distinct concentric patterns opposite coxa IV; shield notched or constricted opposite seta S_2, bearing 16 pairs of setae, eight in lateral (L) series, two in median (M) series and six in dorsal (D) series. All dorsal setae very short and smooth except seta L_8 which is 32μ long and faintly pectinate. Seta M_2 (14μ) barely longer than L_7 and D_1. Remaining setae ranging in length from 8μ (D_6) to 11μ (L_6). Setae L_7 and L_8 arising from small tubercles, the only lateral (L) setae on posterior half of dorsal shield. Setae S_1 and S_2 on interscutal membranes, 14-18μ in length.

Fixed digit of chelicera with three teeth in addition to *pilus dentilis.* Movable digit with single denticle. Peritreme reaches anteriorly to base of seta L_1.

Sternal plate lghtly sclerotized, not readily distinguishable, with two pairs of setae. Third and fourth pairs of sternal setae arise from metasternal plates. Genital plate typical. Spermathecal vesicle rarely apparent, cervix as shown in figure 2, major duct not discernable. Ventrianal plate broadly vase-shaped, longer than wide, widest opposite anus, anterior margin rounded, lateral margins constricted anteriorly, with four pairs of pre-anal setae. Two pairs of metapodal plates, larger plate slender, slightly sinuate.

Setae and minute sclerotized platelets on postero-ventral membrane as illustrated in figure 2.

Basitarsus of leg IV with moderately long macroseta on dorsal surface.

Female measurements.—Dorsal shield, length 336μ, width 182μ. Larger metapodal plate, length 38μ. Leg IV macroseta, length 42μ. Ventrolateral seta, VL_1, length 24μ. (Average—10 specimens).

Male.—Smaller than female, dorsal setal pattern same as in female except seta S_2 on dorsal shield. Chelicera with spur-shaped spermatophoral process.

T. (T.) arceuthobius is readily distinguished from its near relative *T. (T.) pini* Chant by the shape of its ventrianal shield, the presence of but two pairs of ventro-lateral setae and the length of the larger pair of metapodal plates in *T. (T.) arceuthobius*. Seta M_2 is much shorter in *T. (T.) arceuthobius* than in *T. (T.) pini.*

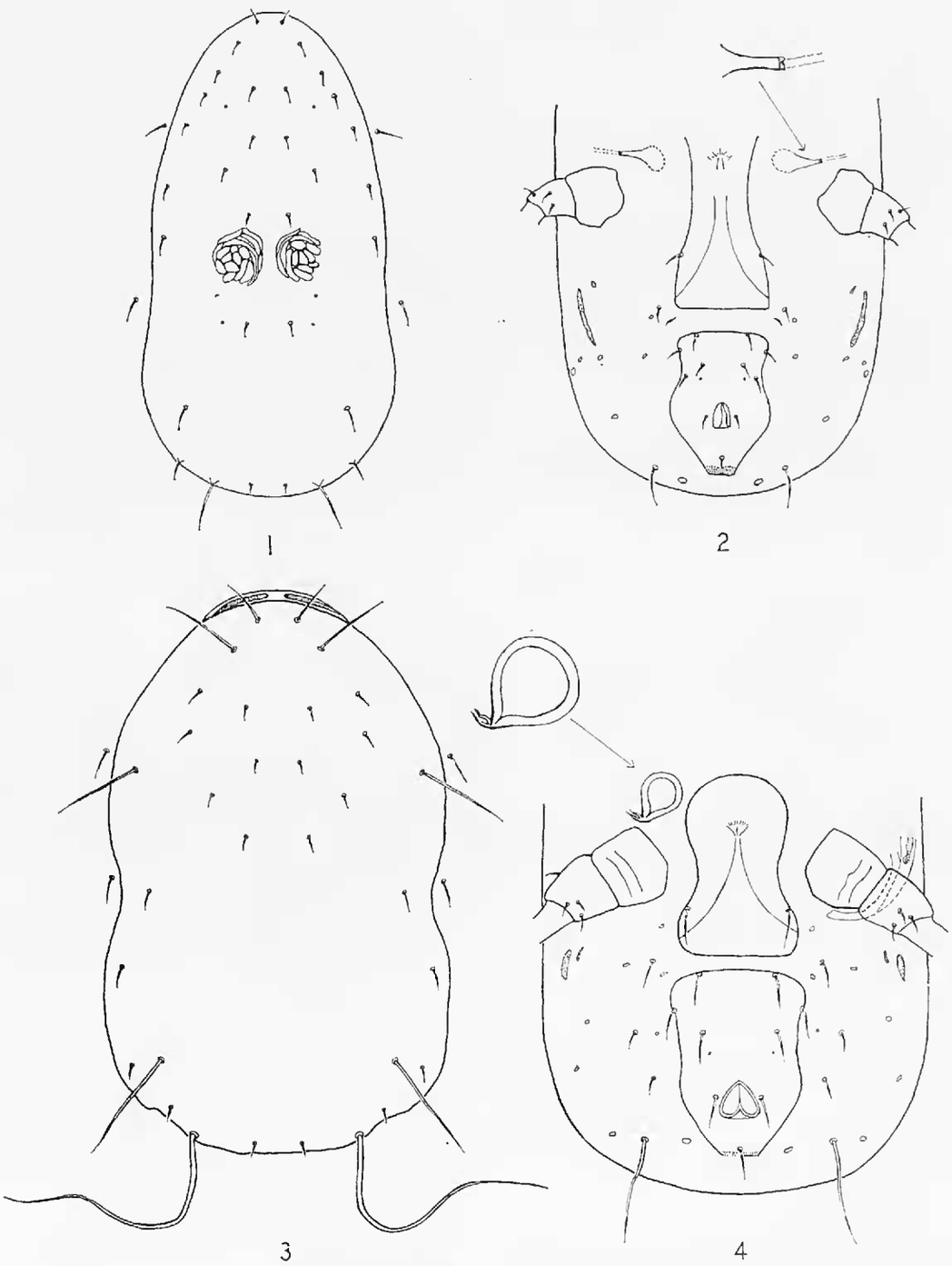
Holotype female, allotype and twelve additional female paratypes from dwarf mistletoe, *Arceuthobium campylopodum* Engelm., occurring on digger pine, *Pinus sabiniana* Dougl. from Mt. Diablo, Contra Costa County, California, December 14, 1960 by C. B. Huffaker and J. Hamai. The female holotype, allotype and seven female paratypes are in the collection of the University of California, Department of Biological Control. Additional paratypes have been deposited in the collection of the California Insect Survey and the United States National Museum. Additional records, all from dwarf mistletoe: Lake County, digger pine, March 28, 1961; Pinecrest, Tuolumne County, Jeffrey pine, March 28, 1961; Snow Lake, Plumas County, Jeffrey pine, May 9, 1961; Fiddletown, Amador County, digger pine, November 19, 1961.

In the several collections to date in California *T. (T.) arceuthobius* has been associated with a false spider mite, *Brevipalpus porca* Pritchard & Baker, described from dwarf mistletoe on Douglas fir in Utah. Pritchard and Baker (1958) also recorded this tenuipalpid from mistletoe on pinyon pine, ponderosa pine and Douglas fir in Arizona. Because of the difficulty in observing *B. porca* and *T. (T.) arceuthobius* on dwarf mistletoe it has not been definitely established, as yet, that this phytoseiid preys on *B. porca.* The absence of any other phytophagous species, however, lends support to a conclusion that *T. (T.) arceuthobius* is predatory upon this mite.

Typhlodromus (Amblyseius) pusillus Kennett, new species

(Figs. 3, 4)

Female.—Dorsal shield smooth, ovate in outline, widest at posterior one-third, faintly sclerotized, with distinct waist opposite seta S_2, bearing 16 pairs of setae, nine in lateral (L) series, two in median (M) series and five in dorsal (D) series. All dorsal setae minute except D_1 (35 - 39μ), L_1 (49 - 52μ), L_4 (63 - 67μ), L_9 (165 - 175μ) and M_2 (74 - 80μ).



EXPLANATION OF FIGURES

Fig. 1, *Typhlodromus (T.) arceuthobius* Kennett, female, dorsal shield; fig. 2, female, postero-ventral aspect. Fig. 3, *Typhlodromus (A.) pusillus* Kennett, Female, dorsal shield; fig. 4, female, postero-ventral aspect.

Setae D_2, D_3 and M_1, 6 - 7μ, L_5, L_7, L_8, D_4 and D_6, 10 - 12μ, L_2 and L_3, 10 - 14μ, L_6, 12 - 14μ. Setae S_1 and S_2 on lateral interscutal membrane.

Fixed digit of chelicera with three small teeth distad and one proximad to *pilus dentilis*. Movable digit with two minute teeth. Peritreme reaches anteriorly to base of seta D_1, peritremal plate ending in a blunt angle posterior to coxa IV.

Ventral plates lightly sclerotized. Sternal plate bearing three pairs of setae (25 - 28μ). Fourth pair of sternal setae arising from small metasternal plates. Genital plate typical, the single pair of setae 28μ. Spermatheca as shown in figure 4. Ventrianal plate longer (130 - 140μ) than wide (95 - 105μ), with three pairs of pre-anal setae (18 - 20μ) and a pair of minute pores. Two pairs of small metapodal plates, larger pair 23 - 27μ in length. Eight pairs of platelets and four pairs of setae on postero-ventral membrane surrounding vetrianal plate, posterior pair of setae (VL_1) 75 - 80μ in length.

Leg IV with macrosetae on genu, tibia and basitarsus. Genu of legs II and III with a seta larger than surrounding setae.

Female measurements.—Dorsal shield, length 410 - 427μ, width 238 - 252μ. Leg IV macrosetae, genu 77 - 84μ, tibia 63 - 75μ, basitarsus 81 - 88μ. Ranges - (6 specimens).

Male.—Smaller than female, dorsal shield ovate, its margin curves ventrally in mounted specimens. Dorsal setal pattern as in female except seta S_2 on dorsal shield. Ventrianal plate imbricate near anterior margin, bearing three pairs of pre-anal setae (16 - 18μ) and a pair of pores.. Chelicera with branched spermatophoral process. Dorsal shield length 330μ (1 specimen).

Typhlodromus (A.) pusillus is a member of the *T. obtusus* group as defined by Chant (1959). It is distinguished from similar species by the relative lengths of setae L_1, L_4, L_9 and M_2, absence of setae D_5, and dentition of the chelicera. A close relationship between *T. (A.) pusillus* and *Amblyseiulus dorsatus* Muma is exhibited by the similarity of their spermathecae.

Holotype female, allotype, and three female paratypes from *Arceuthobium pusillum* Peck, occurring on black spruce, *Picea mariana* (Mill.) BSP, from STOKES BAY, BRUCE COUNTY, ONTARIO, CANADA on July 13, 1961. One female and one male from *A. pusillum* at Howdenvale, Bruce County, Ontario and a single female from *A. pusillum* at Troy, Cape Breton Island, Nova Scotia on July 28, 1961. All collections by C. B. Huffaker and J. Hamai. Female holotype and allotype are in the collection of the University of California, Department of Biological Control. One female paratype is deposited in the collection of the California Insect Survey.

TYPHLODROMUS (TYPHLODROMUS) *bakeri* (Garman)

Seiulus bakeri Garman, 1948:15.

Typhlodromus bakeri (Garman), Nesbitt, 1951:36.

Typtlodromus (T.) bakeri (Garman), Chant, 1959:63.

Four females of this widely distributed species were taken from dwarf mistletoe, *A. pusillum*, occurring on black spruce in the province of Ontario, Canada, one specimen each from the following localities: Stokes Bay, Pine Tree Harbor, and Howdenvale, Bruce County on July 13, 1961, and one from Outlet Park, Prince Edward County, on July 17, 1961, by C. B. Huffaker and J. Hamai. *T. (T.) bakeri* has previously been reported from conifers in England and British Columbia by Chant (1956). The specimens agree with descriptions and figures of *T. (T.) bakeri* published by Garman (1948), Nesbitt (1951), Cunliffe and Baker (1954) and Chant (1958,1959). Determinations were confirmed by D. A. Chant.

The spermatheca as observed in the Canadian specimens bears a marked similarity to that illustrated by Dosse (1958) for *T. (T.) bakeri* in the shape of spermatophores within the vesicle. The cervix in the Canadian specimens appears to be longer, however, measuring 32μ from its base to the atrium.

TYPHLODROMUS (TYPHLODROMUS) *validus* Chant

Typhlodromus (T.) validus Chant, 1957b:290.

This species has been taken from dwarf mistletoe in California at two localities to date. Two females from dwarf mistletoe, *A. campylopodum*, on digger pine 10 miles east of Clear Lake Oaks, Lake County on March 22, 1961, by the author; and four females from the same host at Fiddletown, Amador County on November 19, 1961 by J. Hamai. Chant (1959) reported *T. (T.) validus* from California but made no reference to host plants or locality. Determination was confirmed by D. A. Chant.

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ADDITIONAL RECORDS OF PLATYCLEIS TESSELLATA (CHARPENTIER) IN CALIFORNIA WITH BIOLOGICAL NOTES

(Orthoptera: Tettigoniidae)

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H. F. Strohecker (1955) first recorded the presence of the Mediterranean *Platycleis tessellata* (Charpentier) in California from a single male specimen collected in 1951. Many records have since become available indicating that the species is established in the state.

Specimens in the collection of the Bureau of Entomology, California State Department of Agriculture, Sacramento, were